

*Handwritten:* Kovalenko, B. G.

Investigation of the effect of pH on the solubility product of  $\text{PbSO}_4$  and the solubility product of  $\text{PbSO}_4$  in the presence of  $\text{HNO}_3$ . Kovalenko, B. G. (Sov. Univ. Chem. 1957, 1, 10). The pH of  $\text{PbSO}_4$  in the presence of  $\text{HNO}_3$  was determined. The solubility product of  $\text{PbSO}_4$  was determined in the range of initial concentration  $C_0$  from  $0.1 \times 10^{-3}$  to  $3.0 \times 10^{-3}$  M, where  $a$  and  $b$  are 1.8 and 1.0, resp. The plot of  $\log S$  vs.  $\log C_0$  was a function of  $C_0$ , because approx. linear as the concentration of  $\text{PbSO}_4$  decreased during the process of precipitation so that the curve could be extrapolated to  $C_0 = 0$ . The linear portion of the curve could be used to find  $\log S$  at  $C_0 = 0$ , and  $\log S$  at  $C_0 = 1.0, 0.3, \text{ and } 0.1$ , resp. The curves intersected at one point on the log scale giving the product at infinite dilution. Thus  $\log S_\infty = -1.5$ . The av. value of  $K = qC_0 = 10^{-1.5} = 3.2 \times 10^{-2}$ . J. Kovalenko.

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Ko. A. enko. P. N.

JOURNAL OF ANALYTICAL CHEMISTRY

Vol. III, No. 4, 1957

ON DETECTION OF COBALT

K. E. Bagdasaryan, P. N. Kozlovskiy, and S. S. Melnikova

Moscow State University

When cobalt is detected with thioacetamide, the reaction of the appearance of a blue colour, in dry salts and solutions is shown to be possible by means of grinding powders not only with thioacetamide and thioacetamide, but with other dehydrating agents and even by the careful drying up of the filter paper wetted with the solution of cobalt. In any case, the blue colour appears as a result of dehydrating cobalt aquo-

fra. 00

BUSEV, A.I.; KOVALENKO, P.N.

~~Conditions for separation by electrolysis of bismuth from cobalt~~  
and polarographic determination of the latter. Vest. Mosk. un. Ser.  
mat., mekh., astron., fiz. khim., 12 no.5:151-156 '57. (MIRA 11:9)

1. Kafedra analiticheskoy khimii Moskovskogo gosudarstvennogo  
universiteta.

(Copper) (Photometry)

*KOVALENKO, P.N.*

AKHVONEN, V.A.; GRENBERG, Ye.I.; GENIS, M.Ya.; FEYGINA, E.M.  
ZAKHAROVA, V.S.; KOVALEVA, R.A.; ZALEVSKAYA, T.N. SHASHKIN,  
M.A.; KOVALENKO, P.N.; ZAK, A.G.; AKHMETOVA, S.A.; MOSTRYUKOV,  
P.M.; VITSYKAL, N.D.

Brief reports. Zav.lab. 23 no.7:801-802 '57.

(MLRA 10:8)

1. Institut geologii rudnykh mestorozhdeniy, petrografii, mineralogii  
i geokhimi AN SSSR (for Akhvonon) 2. Dnepropetrovskiy Truboprokatnyy  
zavod imeni V.I. Lenina (for Grenberg, Genis) 3. Angarskiy remontno-  
mekhanicheskiy zavod (for Shashkin) 4. Restovskiy gosudarstvennyy  
universitet (for Kovalenko) 5. Karagandinskiy zavod sinteticheskogo  
kauchuka (for Zak, Akhmetova, Mostryukov, Veyseyskaya).  
(Chemistry, Analytic)

KOVALENKO, P.N.

Importance of pH at the beginning of gallium hydroxide precipitation  
and the determination of the solubility of its derivatives. Zhur.  
prikl.khim, 30 no.1:52-58 Ja '57. (MLRA 10:5)

1. Rostovskiy na Donu gosudarstvennyy universitet imeni V.M. Molotova.  
(Hydrogen-ion concentration)  
(Gallium hydroxide)

Dist: 4E 1/2 E 55

The adsorption of Zn<sup>2+</sup> and Ni<sup>2+</sup> on the surface of ZnO and Zn(OH)<sub>2</sub> was studied by means of a gravimetric method. The results show that the adsorption of Zn<sup>2+</sup> and Ni<sup>2+</sup> on ZnO and Zn(OH)<sub>2</sub> is a reversible process. The adsorption of Zn<sup>2+</sup> and Ni<sup>2+</sup> on ZnO and Zn(OH)<sub>2</sub> is a reversible process. The adsorption of Zn<sup>2+</sup> and Ni<sup>2+</sup> on ZnO and Zn(OH)<sub>2</sub> is a reversible process.



AUTHORS: Busev, A. I., Kovalenko, P. N. SOV 156-58-1-19/46

TITLE: The Polarography of Indium on a Magnesium-, Calcium-, and Zinc-Chloride Base (Polyarografirovaniye indiya na fone khloridov magniya, kal'tsiya i tsinka)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 1, pp. 79 - 82 (USSR)

ABSTRACT: Zinc refinery waste in which the indium content does not surpass 0,1% is one of the sources of indium production. Therefore an accurate and reliable determination method of indium traces in the case of which the main components of the mentioned waste have not to be separated is very desirable. A survey of the methods used is given, their shortcomings are mentioned as well (Refs 1-3). One of the quickest methods is the polarographic method. In the case of very small indium quantities the authors used the method of wet cementation for the purpose of concentration and separation of not noble metals. The indium reduced to metal by means of zinc excess (in a diluted sulfuric acid solution) is solved together with zinc and then is investigated polarographically on the base of the zinc salt. The detection of optimum conditions of a

Card 1/4



The Polarography of Indium on a Magnesium-, Calcium-,  
and Zinc-Chloride Base

SOV 156-58-1-19/46

quantitative indium determination on a base of strong electrolytes (second group of the Mendeleev system) represents the subject of the present paper. For the investigation of the behaviour of the indium ions on a dropping-mercury electrode, the visual polarograph M-7 (dating from 1946) of the Gor'kiy University Scientific Research Institute (NII Gor'kovskogo universiteta) was used. Furthermore the authors used the mirror galvanometer of the Institut fizicheskogo priborostroyeniya LGU (Institute of Physical Instruments and Equipment of the Leningrad State University). In order to find the determinability of indium in various media the influence of the concentrations of the electrolytes mentioned in the title and the pH-values of the solution were investigated. The results for magnesium chloride are shown in figures 1 and 2. Table 1 shows the results with respect to  $\text{CaCl}_2$ . The working out of the polarographic investigation of indium on the base of the zinc-electrolyte which often contains indium as admixture (Ref 5) is very important. Table 2 shows the results. The obtained results make possible the following conclusions:

Card 2/4

The Polarography of Indium on a Magnesium-, Calcium-, and Zinc-Chloride Base SOV/156 58-1-19/46

1) The possibility of using concentrated solutions of magnesium-, calcium-, and zinc-chloride as base for the polarographic determination of small indium quantities (order of magnitude  $10^{-4}$ - $10^{-3}$  mol/l) was proved. 2) The potential of the half wave for indium is shifted to the negative side with rising concentration and the pH-value of all investigated salt base solutions. 3) In all cases the irreversibility of the electrolytical indium reduction was observed. The case of the indium polarographic investigation on a base of 0,2 M-solution of calcium chloride (pH 1,70) is an exception. There are 2 figures, 2 tables, and 5 references, 4 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii Moskovskogo gosudarstvennogo universiteta im. M.V.Lomonosova (Chair of Analytical Chemistry of the Moscow State University imeni M.V. Lomonosov)

SUBMITTED: October 15, 1957  
Card 3/4

The Polarography of Indium on a Magnesium-, Calcium-,  
and Zirc-Chloride Base

SOV/156 58-1-19/46

Card 4/4

AUTHORS: Kovalenko, I. N., Gayderovich, O. I. SOV/156-58-2-22/48

TITLE: Determination of the pH-Value of the Beginning of the Precipitation and of the Activity-Product of Silver-Hydroxide by Means of the Polarographic Method (Opredeleniye znacheniya pH nachala osazhdeniya i proizvedeniya aktivnosti gidrookisi serebra polyarograficheskim metodom)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 2, pp. 294-296 (USSR)

ABSTRACT: The determination of the afore-said pH-value is of importance for the solution of several problems of chemical technology and analytical chemistry of silver. The purpose of the present investigation is to determine the distance of the pH-values both at the beginning and at the end of the silver-hydroxide precipitation in dependence on the silver-concentration and to calculate the activity-product therefrom. For the purpose of determining the silver-concentration, a) the method of additions and b) the method of the "straight line of calibration" (Fig 1) were applied. An abrupt decrease of the diffusion current at a certain pH-value proved the formation of the solid phase of the hydroxide. The beginning of the precipitation of  $AgOH$  at depoi

Card 1/4

SOV/156-58-2-22/48

Determination of the pH-Value of the Beginning of the Precipitation and of the Activity-Product of Silver-Hydroxide by Means of the Polarographic Method

depends on the initial concentration of the silver. Figure 2 shows the decrease of the silver-ion-concentration in dependence on the pH of the solution. An abrupt decrease in concentration takes place at pH 9,2 to 9,3, according to the initial concentration of silver which indicates the formation of the solid  $AgOH$ -phase. Silver-concentrations which are formed at  $pH > 9,2$  to 9,3 were used for the calculation of  $L_p$ . In order to find the value of the activity-product  $L_a$  for Silver-hydroxide, a diagram of the dependence -  $lgL_p$  on the  $Ag^+$  - concentration which decreases due to the increasing pH-value, was established (Fig 3). Within the range of low concentrations of the silver-ions a linear dependence exists between the negative logarithm  $a$  of the solubility product and  $C_{Ag}$  (Refs 2, 3). The value  $a$  is obtained by extrapolation of the curves of figure 3 up to the intersection with the ordinate, i.e. one of an infinitely low silver-concentration, if  $f = 1$ . All curves, independent of the initial concentration of the investigated salt  $AgNO_3$ , coincide in one point which is located on the ordi

Card 2/4

SOV/156-58-2-27/10

Determination of the pH-Value of the Beginning of the Precipitation and of the Activity-Product of Silver-Hydroxide by Means of the Polarographic Method

nate and they cut off a section equal to  $- \lg L_a = 7,25$ .  
 $L_a = 5,63 \cdot 10^{-8}$ . The sources available from publications give contradictory data on the solubility product. They indicate that the determinations were carried out under conditions of different ionic density (Ref 4). It follows from figure 4 (dependence of  $- \lg L_p$  on the pH of the solution) that the deposit taking place in connection with the hydrolysis of a silver-salt is AgON. There are 4 figures and 4 references, 3 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii Rostovskogo-na-Donu gosudarstvennogo universiteta (Chair of Analytical Chemistry of the Rostov-na-Donu State University)

SUBMITTED: October 15, 1957

Card 3/4

SOV/156-58-2-22/48

Determination of the pH-Value of the Beginning of the Precipitation and of the Activity-Product of Silver-Hydroxide by Means of the Polarographic Method

Card 4/4

SOV/156-58-4-24/49

AUTHOR: Kovalenko, P. N.

TITLE: Investigation of the Adsorption of Trivalent Antimony for Manganese Dioxide (Izucheniye adsorbtsii trekhvalentnoy sur'my dnuokis'yu margantsa)

PERIODICAL: Nauchnye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 710-713 (USSR)

ABSTRACT: The influence of manganese (II)-ions upon the colorimetric determination of antimony was investigated and it was found that large quantities of manganese do not exert any influence upon the accuracy of determination of antimony. The colorimetric determination was carried out by means of the spectrophotometer FEK-2. The adsorbability of  $MnO_2$  for antimony as dependent on the concentration of the antimony solution was investigated and it was found that the adsorption represents a hyperbolic curve and obeys the Freundlich-adsorption law. The adsorbability of antimony for  $MnO_2$  depends on time; within two hours the adsorption decreases from 80 to 30 i.e. a 2.7-fold decrease. The highest adsorbability of the  $MnO_2$  was found immediately after its formation.- There are 4 figures, 2 tables

Card 1/2



SOV/156-58-4-24/49

Investigation of the Adsorption of Trivalent Antimony for Manganese Dioxide

and 9 references, 4 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii Rostovskogo-na-Donu gosudarstvennogo universiteta (Chair of Analytical Chemistry at the Rostov-na-Donu State University)

SUBMITTED: March 3, 1958

Card 2/2

**AUTHORS:**

Kovalenko, F. N., Moricheva, N. P.

SOV/156-58-4-25/49

**TITLE:**

Adsorption of Antimony on Copper Hydroxide and the Electrolytic Separation of  $\text{Cu}(\text{OH})_2$  From Antimony (Adsorbtsiya sur'my gidrookis'yu medi i elektroliticheskoye otdeleniye  $\text{Cu}(\text{OH})_2$  ot sur'my)

**PERIODICAL:**

Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 4, pp 714-717 (USSR)

**ABSTRACT:**

The adsorption of antimony (III) on copper hydroxide corresponds to Langmuir (Lengmyura)'s adsorption isotherm. The rapid separation of copper from small amounts of antimony is carried out electrolytically from ammoniacal or hydrochloric solutions in the presence of the depolarizer ammonium persulfate. After the electrolysis small amounts of copper in antimony do not disturb the spectrophotometric determination of antimony with the methyl violet complex. In the presence of antimony(V) it is necessary to carry out a reduction with  $\text{SnCl}_2$  solution. There are 4 figures, 2 tables, and 10 references, 3 of which are Soviet.

Card 1/2

KOVALENKO, P.N.

Use of iodometric titration in determining urotropine. Uch.zap.  
RGU 41:83-93 '58. (MIRA 15:1)  
(Hexamethylenetetramine) (Iodometry)

LEKTONSKAYA, N.A.; KOVALENKO, P.N.

Electrode polarization in the polarographic determination of antimony,  
bismuth, lead, and tin. Uch.zap. RGU 41:95-105 '58. (MIRA 15:1)  
(Metals--Analysis) (Polarography)

KOVALENKO, P.N.; BAKIDASAROV, K.N.

Polarographic determination of the bismuth phosphate solubility  
product. Uch.zap. RCU 41:107-111 '58. (MIRA 15:1)  
(Bismuth phosphate) (Solubility) (Polarography)

IVANOVA, Z.I.; KOVALENKO, P.N.

Mercurimetry in the potentiometric determination of chlorides. Uch.-  
zap. RCU 41:113-122 '58. (MIRA 15:1)  
(Chlorides) (Potentiometric analysis) (Mercurimetry)

KOVALENKO, P.N.

Polarographic determination of small amounts of lead and cadmium in  
copper electrolytes (rapid method). Uch.cap. RGU 41:123-134 '58.  
(MIRA 15:1)

(Lead--Analysis) (Cadmium--Analysis) (Copper--Analysis)  
(Polarography)

5(2,4)  
AUTHORS: ~~Kovalenko, I. N.~~, Dmitriyeva, V. L., SOV/153-86-4-7/22  
(Deceased)

TITLE: Electrocatalysis Using Aluminum Electrodes (Elektroanaliz s primeneniye alyuminiyevykh elektrodov)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i kimicheskaya tekhnologiya, 1958, Nr 4, pp 43 - 48 (USSR)

ABSTRACT: Platinum cannot be widely used for electroanalysis, because it is a scarce and very precious metal. The apparatus required for this purpose is very complex, too (Ref 1). The authors investigated the behavior of the ions in the electroanalysis of some salts by means of aluminum cathodes, because it seems very urgent to find a substitute for the expensive platinum electrodes. The problem is not yet solved, because the properties of the substitute anodes are insufficient. However, the spiral passivated aluminum electrodes of the university and chair mentioned in the association possess the following advantages: 1)

Card 1/4



Electroanalysis Using Aluminum Electrodes

SOV/153-58-4-7/22

Accessibility and inexpensiveness of the material.  
 2) Simple preceding processing of the aluminum surface (formation of a solid oxide-film). 3) In several cases the preceding processing of the electrode surface is no longer necessary. Otherwise it is carried out according to reference 9. The properties of the aluminum electrodes were investigated under conditions unfavorable to them: in the electrolysis of metals in citric acid buffer solutions. Table 1 presents the optimum values of the decomposition voltage and cathodic separation potential at certain values of pH, temperature and concentration of the buffer solution. On the basis of the electrolytic characteristics the authors elaborated methods of quantitative separation and determination by using an aluminum electrode, i.e. for copper, lead, bismuth, cadmium and zinc. The optimum conditions for that are shown in table 2. The authors have drawn the following conclusions from the results: 1) It was confirmed that the oxidized aluminum cathode can be applied to the electrolytic determination of the above mentioned nonferrous metals; 2) Increase in

Card 2/4

Electroanalysis Using Aluminum Electrodes

SOV/153-58-4-7/22

temperature and pH of the copper solution decreases the decomposition voltage ( $E_p$ ) of its salt: simultaneously the separation potential ( $E_k$ ) of copper becomes more negative; 3)  $E_p$  of the lead and bismuth salts decreases with increasing temperature: the  $E_k$  of lead becomes more negative, that of bismuth more positive.  $E_p$  of the lead salt increases with the pH of the solution, the  $E_p$  of bismuth salt, however, decreases:  $E_k$  of these two latter metals becomes more negative; 4) hydroxylamine accelerates the electrolytic separation of the metals on the aluminum cathode and improves the quality of the deposits of the following metals: lead, bismuth, and others. There are 2 figures, 2 tables, and 10 references, 4 of which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet (Rostov-na-Donu State University )Kafedra analiticheskoy khimii (Chair of Analytic Chemistry)

Card 3/4

SOV/153-58-5-4/28

5(4)

AUTHOR:

Kovalenko, P. N.

TITLE:

Electrode Polarization in the Electric Reduction of Some Nonferrous Metals on a Platinum Microcathode (Elektrodnaya polyarizatsiya pri elektrovosstanovlenii nekotorykh tsvetnykh metallov na platinovom mikrokatode)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1958, Nr 5, pp 28-34 (USSR)

ABSTRACT:

The electrode polarization plays an important role in the electrolytic separation of metals the equilibrium potentials which are close to each other. By controlling the temperature, the pH-value and the concentration of the complex forming component the extent of the electrode polarization can be changed, and thus the separation potential can be displaced intervals that secure a complete separation of the metals to be electrolyzed. The visible current density differs in the formation of loose coarse crystalline deposits to a great extent from the actual one. The term current density is rather undefined not taking into account the active surface and its changes in the course of the electrolysis (Refs 1-3). It can

Card 1/4

SOV/153-58-5-4/28

Electrode Polarization in the Electric Reduction of Some Nonferrous Metals  
on a Platinum Microcathode

maintain its approximate importance only if a continuous fine crystalline shiny deposit is formed on the cathode. To calculate the characteristics of the electrode polarization during the electric reduction on a microcathode of platinum the equation of the concentration polarization can be used. These characteristics make possible the outlining of correct ways in selecting the optimum conditions of the electrolytic separation and determination of metals, especially of copper, bismuth, lead, cadmium and zinc. The author derives the equation of the electrode polarization (8) and therefrom determines the coefficients of the logarithmic functions. Tables 2 and 3 give the characteristics of the electrode polarization  $\eta$  of the 4 metals mentioned. On the basis of the results obtained the author assumes that the polarization in the electric separation of the metals investigated on a solid platinum electrode is caused by two factors: 1) Hampering of the process of electric crystallization, and 2) The slow decomposition process of the complex metal ions. Corresponding values of the polarization characteristics in the electric separation of the metals in question are given in figure 1. Based on the results obtained the author

Card 2/4

BOV/153-58-5-4/28

Electrode Polarization in the Electric Reduction of Some Nonferrous Metals  
on a Platinum Microcathode

arrives at the following conclusions: 1) The comparison of the characteristics of the electrode polarization ( $\eta$ ) in the electric separation of Cu, Bi, Pb, Cd and Zn on a mercury dropping cathode and on a platinum microcathode makes possible the determination of the character of the additional polarization. 2) The electrode polarization in the electrolytic separation of the metals mentioned is much lower on a mercury dropping cathode than on a solid platinum cathode. The determination of the optimum conditions of the electrolytic separation of the metals (pH-values, temperature and the concentration of the complex forming components) is made possible by the analysis of the results obtained with respect to the characteristics of the electrode polarization. There are 1 figure, 3 tables, and 14 Soviet references.

ASSOCIATION: Rostovskiy gosudarstvennyy universitet, Kafedra analiticheskoy khimii (Rostov State University, Chair of Analytical Chemistry)

Card 3/4

Kovalenko, P. N.

AUTHOR: Kovalenko, P. N.

78-3-5-1/39

TITLE: Polarographic Determinations of the Beginning of Precipitation of Tin (II) Hydroxide From Hydrochloric Acid Solution and the Calculation of Its Solubility Product (Polarograficheskoye opredeleniye nachala osazhdeniya gidrookisn. olova (II) iz solyanokisllogo rastvora i vychisleniye yeye proizvedeniya rastvorimosti)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol 3, Nr 5, pp 1065-1070 (USSR)

ABSTRACT: By polarographic methods that concentration of hydrochloric acid was determined, at which a precipitation of tin (II) hydroxide takes place. The properties of the mercury-drop electrode allow a successful application of the polarographic method for the examination of the tin (II) concentration. It has been shown that the beginning of the precipitation of tin (II) hydroxide depends on the concentration of tin ions in the solution. Together with an increase of the concentration of tin ions, during which  $\text{Sn (OH)}_2$  occurs, the concentration of hydrochloric acid is also increased. Th

Card 1/2

Polarographic Determinations of the Beginning of  
Precipitation of Tin (II) Hydroxide From Hydrochloric Acid  
Solution and the Calculation of Its Solubility Product

78-3-5-1/39

solubility product of tin(II)hydroxyde was determined at 22°C, amounting to  $0.8 \cdot 10^{-28}$ . The solubility products of  $\text{Sn(OH)}_2$  at different tin concentration, the hydrochloric acid concentrations being constant, differ from one another, and a proportionality exists between the solubility product and the tin concentration. There are 5 figures, 2 tables, and 17 references, 15 of which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet  
(Rostov-on-Don State University)

SUBMITTED: May 21, 1957

AVAILABLE: Library of Congress

1. Tin--Precipitation--Polarographic analysis 2. Hydrochloric acid--Polarographic analysis 3. Polarographic analysis--Hydrochloric acid

Card 2/2

AUTHOR: Kovalenko, P. N. SOV/75-13-4-13/29

TITLE: The Application of an Indirect Titrimetric Method in the Determination of Bismuth (Primeneniye metoda dobavok pri titrimetricheskom opredelenii vismuta)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol. 13, Nr 4, pp. 449-452 (USSR)

ABSTRACT: Of all known methods for the titrimetric determination of bismuth (Ref 1) the phosphate method offers the best prospects although all variants of the titrimetric determination methods of bismuth known hitherto have a low reproducibility and an insufficient accuracy. For the determination of bismuth according to the phosphate method which would be very well suited satisfying indicators are lacking for the accurate determination of the point of equivalence. The method is based on the precipitation of bismuth from nitric acid solution in the presence of sodium acetate with an excess of a given sodium phosphate solution. After the filtering off and washing of the precipitate the excess sodium phosphate is titrated back with a uranyl acetate solution. Potassium ferrocyanide, or also a cochineal infusion (Ref 2) serve as indicator. A complicated method which is based on a

Card 1/4



SOV/75-13-4-13/29

## The Application of an Indirect Titrimetric Method in the Determination of Bismuth

similar principle (Ref 3) does not offer any good results because of repeated operations causing considerable losses. A more simple method (Ref 4) is based on the direct titration of the nitric acid bismuth solution with a standard solution of  $\text{Na}_2\text{HPO}_4$  where the point of equivalence is determined by the occurrence of a color with hematin paper. There the error is 7-9%. According to that method satisfying results may be obtained when an excess reagent is added and then a back-titration is made. There are also methods based on the reduction of bismuth ions to metal by means of magnesium, zinc, copper (Ref 5), aluminum (Ref 6), and other metals. The determination takes place by a subsequent oxidation of the metallic bismuth with Ferrichloride. The  $\text{FeCl}_2$  forming is quantitatively determined according to Zimmermann-Reinhard by means of potassium permanganate. Of all these methods the reduction with aluminum dust is the most simple, the most rapid, and the most accurate. The authors of the present article investigated the kinetics of the reduction of bismuth, the influence exerted by the concentration of Ferrichloride on the oxidation of the metallic bismuth. They

Card 2/4

The Application of an Indirect Titrimetric Method in the Determination of Bismuth SOV/75-13-4-13/29

also found the optimum quantities of the Zimmermann-Reinhard mixture added. The optimum conditions for the oxidation of metallic bismuth with a  $\text{FeCl}_3$  solution is mentioned. It was found that the method of the back titration of an excess reagent increases the accuracy and reproducibility of the results in the titrimetric determination of bismuth. The following composition was found for the kinetics of the reduction process of bismuth in metallic aluminum:

$$K = \frac{1}{t} \lg \frac{a}{a-x};$$

where  $a$  denotes the initial concentration of bismuth, and  $a-x$  the concentration of bismuth at the time  $t$ . At a temperature of  $40^\circ$   $K = 0,125$ . After 18 minutes bismuth is practically reduced quantitatively. There are 3 figures, 2 tables, and 12 references, 2 of which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet (Rostov na Don State University)

Card 3/4

The Application of an Indirect Titrimetric Method on the Determination of  
Bismuth SOV/75-13-4-13/29

SUBMITTED: October 29, 1956

1. Bismuth--Determination 2. Bismuth---Precipitation 3. Phosphates  
--Chemical reactions 4. Titration

Card 4/4

KOVALENKO, P.N.

Determination of the initial precipitation of basic tin (IV) salt from hydrochloric acid and calculation of its solubility product. Ukr.khim. zhur. 24 no.5:656-660 ' 58.  
(MIRA 12:1)

1. Rostovskiy-na-Donu gosudarstvennyy universitet.  
(Tin compounds) (Precipitation) (Solubility)



KOVALENKO, P.N.

Polarographic determination of  $p^H$  at the beginning of the precipitation of antimony hydroxide and calculation of its solubility product. Zhur. prikl. khim. 31 no.10:1488-1493 O '58.  
(MIRA 12:1)

1. Rostovskiy gosudarstvennyy universitet.  
(Polarography) (Antimonous acid) (Hydrogen-ion concentration)

**KOVALENKO, P.N.**

Reactions of mutual displacement of metals. Part 1: Reduction of  
bismuth and copper with metallic cadmium and lead, and their polaro-  
graphic determination. Uch. zap. RGU 40:3-21 '58. (MIRA 13:10)  
(Bismuth---Analysis) (Copper---Analysis)

KOTALENKO, P.N.

Polarographic method for determining the extent of the adsorption of  
metal ions from aqueous solutions by aluminum hydroxide. Uch. zap.

HGU 40:23-33 58

(MIRA 13:10)

(Adsorption)

(Alumina)

(Polarography)



KOVALENKO, P.N.

Reactions of mutual displacement of metals. Part 2: Polarographic  
determination of small amounts of metallic zinc in zinc whites.

Uch. zap. HGU 40:35-44 '58.

(MIRA 13:10)

(Zinc—Analysis)

(Zinc oxide)

KOVALENKO, P.N.

Coprecipitation of copper and aluminum when both are present. Uch.  
zap. RGU 40:44-56 '58. (MIRA 13:10)  
(Copper hydroxide) (Aluminum hydroxide)

KOVALENKO, P.N.

Reactions of mutual displacement of metals. Part 3: Rapid method of  
determining lead in granular slags polarographically. Uch. zap. RGU  
40:57-68 158. (MIRA 13:10)  
(Lead--Analysis) (Polarography)

NADEZHINA, L.S.; KOVALENKO, P.N.

Rapid method of determining trace amounts of nickel and cobalt in  
zinc electrolytes. Uch. zap. RGU 40:69-86 '58. (MIRA 13:10)  
(Nickel--Analysis) (Cobalt--Analysis)

IVANOVA, Z.I.; KOVALINKO, P.N.

Potentiometric determination of calcium and magnesium. Uch. zap.  
RGU 40:93-201 '58. (MIRA 13:10)  
(Calcium--Analysis) (Magnesium--Analysis)

BAGDASAROV, K.N.; KOVALENKO, P.N.

Electrolytic reduction of tin and antimony on nichrome and nickel-plated cathodes. Uch. zap. RGU 40:113-126 '58. (MIRA 13:10)

(Tin)

(Antimony)

(Reduction, Electrolytic)

KUTALENKO, P.N.; IGNIKOVA, L.A.

Separation of cadmium from small amounts of zinc in a nitric acid-citric acid solution by means of an aluminum cathode, and a polarographic determination of zinc. Uch. zap. BVU 40:127-137 '58.

(Cadmium)

(Zinc--Analysis)

(NIRA 13:10)  
(Aluminum)

KOVAL'NEO, P.N.

Electroanalytical determination of bismuth. Uch. zap. RGU 40:139-148  
'58. (MIRA 13:10)

(Bismuth--Analysis)



LIETORSKAYA, N.A.; KIVALENKO, P.N.

Determination of antimony and bismuth in zinc electrolytes. Uch.  
zap. RGU 40:173-177 '58. (MIRA 13:10)  
(Antimony--Analysis) (Bismuth--Analysis)

5(2)

AUTHORS:

Kovalenko, P. M., Dmitriyeva, V. L. (Deceased)

SOV/156-59--1-23/54

TITLE:

The Separation of Copper and Bismuth When Electrically Precipitated on an Amalgamated Copper Cathode (Razdeleniye medi i vismuta pri elektroosazhdenii ikh na amal'gamirovannom mednom katode)

PERIODICAL:

Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 1, pp 97-101 (USSR)

ABSTRACT:

The separation potentials and the decomposition voltages of copper nitrate and bismuth nitrate in a sodium tartrate solution have been investigated with respect to their dependence on temperature and concentration. With increasing pH the discharge potentials are displaced in the negative direction and their values decrease upon an increase in temperature. The decomposition voltage drops strongly with increasing temperature (Diagrams). An increased concentration of sodium tartrate does not affect the separation of copper whereas the separation potential of bismuth becomes more negative. This enables a separate electric precipitation of bismuth and copper. As an optimum a 0.5-0.8 n solution of sodium tartrate at pH 5 and 20° has been found. In this case

Card 1/2

SOV/156-59-1-23/54  
The Separation of Copper and Bismuth When Electrically Precipitated on an Amalgamated Copper Cathode

the separation potentials and decomposition voltages for copper and bismuth show the greatest difference. However, copper forms a spongelike, loose precipitate at this temperature. A fine crystalline precipitate is not formed below 60°. For this reason it is recommended to separate copper and bismuth in 0.5 n sodium tartrate at pH 4-5 and 60°. The results of the electrolysis carried out under various experimental conditions are shown in tables. There are 2 figures, 6 tables, and 6 references, 3 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii Rostovskogo-na-Donu gosudarstvennogo universiteta  
(Chair of Analytical Chemistry of Rostov-na-Donu State University)

SUBMITTED: September 11, 1958

Card 2/2

5(2)

AUTHORS:

Lektorskaya, N. A., Kovalenko, P. N.

SOV/156-59-1-24/54

TITLE:

The Polarographic Determination of Bismuth and Antimony, Lead and Tin in Joint Presence (Polyarograficheskoye opredeleniye vismuta i sur'my, svintsa i olova pri sovместnom prisutstvii)

PERIODICAL:

Nauchnyye dcklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 1, pp 102-104 (USSR)

ABSTRACT:

The check of the electrolytic purification of tin requires a quick and reliable method for the determination of the admixtures of bismuth, antimony and lead. The halfwave potentials of tin and lead agree during their reduction. The same applies to bismuth and antimony. Sodium fluoride was used as a complexing agent to displace the discharge potentials.  $\text{NaF}$  ( $9.5 \cdot 10^{-2}$  to  $1.19 \cdot 10^{-1}$  ml/l) displaces the half-wave potential of antimony by 0.2-0.076 volts with respect to the half-wave potential of bismuth and suppresses the diffusion current of tin. The concentration of hydrochloric acid in the tin salt solution in the presence of sodium chloride for the polarography of bismuth and antimony must not exceed 0.75 n and in the case of lead and tin must not be less than 1.75 n. The amplitude of the differential

Card 1/2

SOV/156-59-1-24/54  
The Polarographic Determination of Bismuth and Antimony, Lead and Tin in Joint Presence

wave of lead bismuth and antimony is directly proportional to their concentration. The amplitude of the wave of tin can be calculated from the total of the wave amplitudes of lead and tin. A prescription is given how to perform the polarographic analysis. The polarographic determination of the four metals has been carried out on samples of industrial tin and on artificially composed mixtures. The accuracy achieved has been given in tables. There are 3 tables and 6 references, 3 of which are Soviet.

ASSOCIATION: Kafedra analiticheskoy khimii Rostovskogo-na-Donu gosudarstvennogo universiteta  
(Chair of Analytical Chemistry of Rostov-na-Donu State University)

SUBMITTED: July 30, 1958

Card 2/2

KOVALENKO, P.N.

Polarographic determination of small quantities of bismuth and zinc in copper electrolytes and of zinc in bismuth electrolytes with a preliminary separation of main components by means of electrolysis. Uch.zap.RGU no.60:65-70 '59. (MIRA 14:10)  
(Zinc---Analysis) (Bismuth---Analysis) (Polarography)

KOVALENKO, P.N.

Polarographic method for determining the velocity constant of  
cadmium electrolysis. Uch.zap.RGU no.60:71-78 '59. (MIRA 14:10)  
(Cadmium) (Electrolysis)

KOVALENKO, P.N.

Job reaction for the photocolorimetric determination of small  
amounts of cobalt in solutions of electrolysis zinc. Uch.zap.  
RGU no.60:79-186 '59. (MIRA 14:10)  
(Cobalt--Analysis)



KOVALENKO, P.N.

Determination of aluminum by ammonium phosphate in an acetic-acid  
medium in the presence of calcium and magnesium. Uch.zap.RGU  
no.60:87..93 :49. (MIRA 14:10)  
(Aluminum--Analysis) (Phosphates)

KOVALENKO, P.N.

Study of chromium oxidation in the presence of aluminum. Uch.  
zap.RGU no.60:95-104 '59. (MIRA 14:10)  
(Chromium) (Oxidation) (Aluminum)

BAGIMASAROV, K.N.; KOVALENKO, P.N.

Polarographic determination of zinc in tin with the precipitation  
of tin by metallic aluminum. Uch.zap.RGU no.60:109-115 '59.

(MIRA 14:10)

(Zinc--Analysis) (Tin--Analysis) (Aluminum)

IVANOVA, Z.I.; KOVALENKO, P.N.

Potentiometric determination of manganese in zinc electrolytes.

Uch.zap.RGU no.60:23-127 :59.

(MIRA 14:10)

(Manganese Analysis) (Potentiometric analysis)

IVANOVA, Z.I.; KOVALENKO, P.N.

Potentiometric method for determining chlorides in dry products  
of zinc manufacture. Uch.zap.NGU no.60:129-134 '59. (MIRA 14:10)

(Chlorides)

(Zinc)

5(2)

SOV/153-2-3-3/29

AUTHORS: Kovalenko, P. N., Moricheva, N. P.

TITLE: Photocolorimetric Determination of Antimony in Zinc Electrolytes and Alloys

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 3, pp 322-327 (USSR)

ABSTRACT: In the introduction the existing methods are briefly mentioned as well as the following Soviet authors: Kuznetsov (Ref 6), Lur'ye, Filippova (Refs 7, 9). The complex of antimony with methyl violet was extracted with benzene and determined with the colorimeter of the type FEK-2 (calibration curve see Fig 1). The investigation was made in order to find out to what degree this determination is disturbed by other ions. The determination of 0.02 mg Sb in 50 ml showed that amounts of up to 40 mg Cu, 40 mg Ni, 100 mg Cd have no noticeable influence (Table 1).  $Fe^{3+}$  contents cause strong negative deviations which may be removed by increased hydrochloric acid concentration (Fig 2) and a higher addition of  $KNO_3$  (Table 2). Furthermore, the influence exercised by  $ZnSO_4$  and  $MnSO_4$  on the determination of antimony

Card 1/2

Photocolorimetric Determination of Antimony in      SOV/153-2-3-3/29  
Zinc Electrolytes and -Alloys

was investigated (Table 3). 20 mg  $MnSO_4$  and 250 mg  $ZnSO_4$  in 50 ml do not influence the determination of 0.002 to 0.060 mg antimony; amounts of less than 0.002 mg cannot be determined precisely. Moreover, the antimony content in a bronze, a tin-lead alloy, Babbit I and Babbit II were determined (Table 4). There are 2 figures, 4 tables, and 10 references, 5 of which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet; Kafedra analiticheskoy khimii (Rostov-na-Donu State University, Chair of Analytical Chemistry)

SUBMITTED: March 6, 1958

Card 2/2

5(2)

SOV/78-4-8-34/43

AUTHORS: Kovalenko, P. N., Lindorf, T. V.

TITLE: The Polarographic Determination of the pH at the Beginning of the Dissolution and of the Solubility Product of the Hydroxide of Trivalent Thallium (Polyarograficheskoye opredeleniye pH nachala rastvoreniya i proizvedeniya rastvorimosti gidrookisi trekhvalentnogo talliya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 8, pp 1919-1923 (USSR)

ABSTRACT: The authors pointed out the advantages of the polarographic method already in earlier papers (Refs. 1,2,6). Various scientists (Refs. 1,2,6-8) found that the solubility product is not constant but depends on the ionic concentration, above all, on the concentration of the hydroxyl groups. This apparent non-agreement with the law of mass action could be eliminated by placing the activity of the ions instead of the concentration  $a = f \cdot c$  ( $a$  = concentration of the solvated ions). Since trivalent thallium shows no polarographic wave, whereas monovalent thallium may be easily polarized, the following method was chosen for the determination of the pH of the solution

Card 1/3



SOV/78-4-8-34/43

The Polarographic Determination of the pH at the Beginning of the Dissolution and of the Solubility Product of the Hydroxide of Trivalent Thallium

$Tl(OH)_3$  and its solubility product: at given pH a saturated solution of  $Tl(OH)_3$  was produced,  $Tl^{3+}$  was quantitatively reduced to  $Tl^+$  by means of hydrazine sulphata and the latter was polarographically determined. The dependence of the diffusion current on the pH of the medium is shown by table 1 and figure 1. Since the concentration of  $Tl^+$  after the reduction is equal to the original concentration of  $Tl^{3+}$  the determination of the  $Tl^{3+}$  concentration was carried out by means of a calibration curve  $i_d = c_{Tl^{3+}}$  (Fig 2) ( $i_d$  = intensity of the diffusion current in  $\mu A$ ). The dependence of the concentration of the thallium ions on the pH of the solution is shown by figure 3. There exists a reverse logarithmic dependence between  $c_{Tl^{3+}}$  and the pH value of the solution at which  $Tl(OH)_3$  passes into solution. By extrapolating this straight line  $-lg_{\text{solubility product}} - \text{ionic concentration}$  (Fig 4) the solubility product for  $Tl(OH)_3$  was determined to

Card 2/3

SOV/78-4-8-34/43

The Polarographic Determination of the pH at the Beginning of the Dissolution  
and of the Solubility Product of the Hydroxide of Trivalent Thallium

be  $6.5 \cdot 10^{-35}$ . The dissolution of  $Tl(OH)_3$  begins at  $pH = 3.46$ .

The method by D. F. Spenser and B. Abegg (Ref 10) for determining the solubility product of  $Tl(OH)_3$  has shortcomings and therefore leads to considerable errors. There are 4 figures, 1 table, and 13 references, 11 of which are Soviet.

SUBMITTED: December 3, 1957

Card 3/3

5(2)

SOV/78-4-9-7/44

AUTHORS:

Kovalenko, P. N., Geyderovich, O. I.

TITLE:

The Determination of the pH of the Beginning of Precipitation as Well as of the Activity Product of Beryllium Hydroxide

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 9, pp 1974-1978 (USSR)

ABSTRACT:

The publications on the solubility of beryllium hydroxide are contradictory (Refs 1, 2, 8). From references 1-5 it is evident that the composition of the hydroxyl compounds of Be varies with the conditions of precipitation. The pH values at the beginning and the end of the precipitation of  $\text{Be}(\text{OH})_2$  were determined polarographically by means of a dropping mercury cathode. A direct proportionality between Be concentration and strength of diffusion current of good reproducibility was obtained on addition of tetramethyl and tetraethyl ammonium salts (Fig 1). Average values of a number of measurements are given in table 1. As shown in figure 2, precipitation begins at pH 2.35 - 2.65 depending on the Be concentration

Card 1/3

SOV/78-4-9-7/44

The Determination of the pH of the Beginning of Precipitation as Well as of the Activity Product of Beryllium Hydroxide

(between  $1 \cdot 10^{-3}$  and  $0.5 \cdot 10^{-3}$ ) but is always completed at pH 3.1, irrespective of the Be concentration. Basic salts are formed at the outset, the hydroxide only being formed at the end of precipitation (pH 2.9 - 3.1). The solubility product (SP) is not a constant, as is shown in figure 3, but depends on the concentration of beryllium, a linear relationship existing between  $-\lg SP$  and the concentration. On extrapolating the straight lines plotted for the various concentrations to zero concentration,  $-\lg AP = \text{const} = -25.7$  is obtained for the activity product (AP). This corresponds to the concentration of beryllium at the end of precipitation at pH 3.1. Thus, the AP for  $Be(OH)_2$  is equal to  $2 \cdot 10^{-26}$ . There are 3 figures, 1 table, and 24 references, 15 of which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet  
Card 2/3 (Rostov-na-Donu State University)

5(2), 5(4)  
AUTHORS:

Ivanova, Z. I. and Kovalenko, P. N.

SOV/75-14-1-17/32

TITLE:

Potentiometric Determination of Phosphate Ions (Potentsio-  
metricheskoye opredeleniye fosfat-ionov)

PERIODICAL:

Zhurnal analiticheskoy khimii, 1959, Vol 14, Nr 1, pp 87-90  
(USSR)

ABSTRACT:

The authors worked out a rapid and exact method for the potentiometric titration of phosphate ions, in which a mercury electrode and a titrator consisting of a solution of mercury (II) nitrate is used. A saturated calomel electrode is used for comparison. The indicator electrode used in this case offers several advantages compared to the mercury electrodes hitherto used (Refs 1,2). It is illustrated and described in detail in the present paper. An investigation of the accuracy of this method showed that with a decrease of phosphate solution concentration errors increase. For quantities of not less than 5 ng/l the accuracy of potentiometric titration is satisfactory. The reproducibility of results is good. An addition of ethyl alcohol to the solution reduces the error committed in the titration of small quantities of phosphate ions, as alcohol on the one hand diminishes the adsorption of phosphate ions,

Card 1/3

## Potentiometric Determination of Phosphate Ions

SOV/75-14-1-17/32

and, on the other, reduces the solubility of the precipitate (Refs 3,4). The bottom extracts to be analyzed frequently contain colloidal substances, which, however, do not disturb potentiometric determination. The addition of gelatin in quantities that are 20 to 100 times in excess of those of phosphate ions exercises practically no influence upon the results. The error committed when determining small quantities of phosphate ions can be considerably reduced and even fully eliminated if determination is carried out by the method of double addition (Refs 5-8). A comparison of the respective results is given by a table. Chloride ions which very frequently occur in samples together with phosphate, do not change titration results even if present in quantities that are 100 times greater. It is even possible to determine phosphate and chlorides successively from one and the same sample. The titration of phosphate can be carried out in the pH - range of 10 - 3. The ions  $\text{Ca}^{2+}$ ,  $\text{Ba}^{2+}$ ,  $\text{Mg}^{2+}$  and  $\text{SO}_4^{2-}$  do not disturb determination. The method was used for the analysis of minerals. It was found that as regards accuracy it is not surpassed by the gravimetric method of determination (double precipitation as pyrophosphate). The

Card 2/3

Potentiometric Determination of Phosphate Ions

SOV/75-14-1-17/32

potentiometric method has the advantage of being rapid and simple (analysis takes 1.5 to 2 hours). There are 3 figures, 3 tables, and 6 Soviet references.

ASSOCIATION: Rostovskiy gosudarstvennyy universitet (Rostov State University)

SUBMITTED: September 23, 1957

Card 3/3

5(2)

AUTHORS:

Ivanova, M. I., Kovalenko, P. N.

SOV/32-25-3-12/62

TITLE:

Determination of Chlorides in Solutions of Zinc Production According to the Method of Noncompensated Potentiometric Titration (Opredeleniye khloridov v rastvorakh tsinkovogo proizvodstva metodom nekompensatsionnogo potentsiometricheskogo titrovaniya)

PERIODICAL:

Zavodskaya Laboratoriya, 1959, Vol 25, Nr 3, pp 290 - 291 (USSR)

ABSTRACT:

A potentiometric noncompensated method was devised for the titration of small amounts of chloride in zinc and cadmium electrolytes. The method is based upon the application of a titrated mercury solution. Metallic mercury is used as an indicator electrode and a tungsten electrode serves as a comparison electrode (Fig). The titration vessel has already been described (Ref 1). Solutions of a chloride content of 0.2 - 120 mg per 100-150 ml may be investigated. The limiting error in the determination is between  $\pm 0.3$  and  $\pm 3.7\%$  (Table 1). At a pH value of from 3 to 8 the most accurate results are obtained. The presence of up to 130 g/l zinc, up

Card 1/2



Determination of Chlorides in Solutions of Zinc Production SOV/32-25-3-12/62  
According to the Method of Noncompensated Potentiometric Titration

to 14 g/l manganese, up to 90 mg/l cadmium, up to 50 mg/l cobalt, up to 10 mg/l antimony, and up to 2 mg/l copper does not disturb the determination of chloride (Table 2). The maximum deviation of potentiometric determination from the analysis carried out by the gravimetric methods is  $\pm 0.72\%$ . Duration of analysis: 5 - 10 minutes. There are 1 figure, 2 tables, and 1 Soviet reference.

ASSOCIATION: Rostovskiy gosudarstvennyy universitet (Rostov State University)

Card 2/2

SOV/76-33-2-1/45

5(4)  
AUTHOR:

Kovalenko, P. N.

TITLE:

The Use of the Polarograph in Investigating the Effect of Strong Electrolytes on the Electrolysis of Copper and Cobalt  
(Primeneniye polyarografa dlya izucheniya vliyaniya sil'nykh elektrolitov na protsess elektroliza medi i kobal'ta)

PERIODICAL:

Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 2, pp 241-248  
(USSR)

ABSTRACT:

According to what has hitherto been found (Refs 1-3) the potential of the semi-wave  $E_{1/2}$  in the electroreduction of metals is a constant quantity and depends only on the nature of the salt subjected to a polarographic investigation. In the present case it is proven that  $E_{1/2}$  also depends essentially on the nature and the concentration of the background. It is found that the computation of the value for  $i_d$  according to the formula of Stackelberg (Shtakel'berg) (Ref 12) is complicated and gives no better results than the formula of Ilkovic (Il'kovich) (Ref 2). A varied version of Ilkovic's formula is given:

Card 1/3

The Use of the Polarograph in Investigating the Effect of Strong Electrolytes on the Electrolysis of Copper and Cobalt SOV/76-33-2-1/45

$i_d = 605 \cdot n c (a_D - b \mu)^{1/2} k$ , which allows determinations of the diffusion-current with more exact results. The experiments in question were made with sulphuric-, and hydrochloric-acid solutions of cobalt ( $2 \cdot 10^{-3}$  mol/l) and copper ( $2.5 \cdot 10^{-3}$  mol/l) on polarographing backgrounds of solutions of several cations of the I, II, III and IV analytical groups. The copper-reduction proceeds under these conditions reversibly, while in the case of cobalt also chemical polarization occurs. The latter is greater at the Hg-cathode in the case of sulphuric-acid backgrounds greater than with hydrochloric acid backgrounds. The value of  $E_{1/2}$  in cobalt, shifts in dependence of the nature of the background considerably towards negative values; while in copper a rather strong effect only by  $AlCl_3$  and  $BaCl_2$  solutions is noticeable. The diffusion-current of the Cu and Co-ions changes it by polarographing with the concentration of the examined electrolyte and diminishes all the more as the valence of the electrolyte-ion, the concentration remaining the same, increases (Tables 1, 2).

Card 2/3

The Use of the Polarograph in Investigating the                      SOV/76-33-2-1/45  
Effect of Strong Electrolytes on the Electrolysis of Copper and Cobalt

By investigations of copper, which took place on a background  
of iron (III) and cobalt, deformed polarograph-waves were  
obtained. There are 4 figures, 2 tables, and 15 references,  
8 of which are Soviet.

ASSOCIATION: Gosudarstvennyy universitet, Rostov-na-Donu  
(State University, Rostov-na-Donu)

SUBMITTED: January 10, 1957

Card 3/3

NADEZHINA, L.S.; KOVALENKO, P.N.

Polarographic method of determining the diffusion coefficients  
of nickel and cobalt in solutions of various complex-forming  
compounds. Trudy LPI no.201:127-135 '59. (MIRA 13:3)  
(Nickel) (Cobalt) (Diffusion)

KOVALENKO, Petr Nikitich; SIMONOV, A.M., prof., red.; ZARKHINA, I.Ya.,  
red. izd-va; PAVLICHENKO, M.I., tekhn. red.

[Combined electrochemical analysis of nonferrous metals] Kombinirovanniy elektrokhimicheskii analiz tsvetnykh metallov. Rostov-na-Donu. Izd-vo Rostovskogo univ., 1960. 204 p. (MIRA 14:9)  
(Nonferrous metals--Analysis) (Electrochemical analysis)

KOVALENKO, P.N.; DIGTYAREVA, N.I.

Polarographic determination of the start of the precipitation of a basic salt of antimony (V) in a hydrochloric acid solution, and calculation of the solubility product of this salt. Zhur.neorg.khim. 5 no.6:1189-1195 Je '60. (MIRA 13:7)

1. Rostovskiy-na-Donu gosudarstvennyy universitet.  
(Antimony chloride)  
(Reduction, Electrolytic)

S/073/60/026/005/004/019  
B004/B063

AUTHORS: Kovalenko, P. N. and Bagdasarov, K. N.

TITLE: Electrode Polarization in the Electrodeposition of Cadmium, Tin, and Antimony

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, 1960, Vol. 26, No. 5, pp. 573-574

TEXT: Polarization in the electrolytic reduction of Cd, Sn, and Sb has been studied under conditions of practical quantitative electroanalysis. Copper- and nickel-plated Pt grid cathodes, and also spiral nichrome or Al electrodes were used for the purpose. The cathode potential was measured by the method of compensation. The effective activation energy B was calculated from the function  $\log I = A - B/2.3RT$  (1) (I - current density; A - constant; B - effective activation energy). To be independent of variations in current density, the initial current density  $I_1$  and the final current density  $I_n$  were substituted in equation (1). From the equation  $\log(I_1/I_n) = (B/2.3R)(1/T_n - 1/T_1)$  B was calculated to be

Card 1/2



Electrode Polarization in the Electro-  
deposition of Cadmium, Tin, and Antimony

S/073/60/026/005/004/019  
B004/B063

4.57  $\Delta \log I(\Delta/T)$ . The effective activation energy obtained for Cd was equal to 10,000 cal/mole. Chemical polarization occurred during the reduction of Cd on the copper-plated Pt electrode. For the reduction of Sn and Sb on the copper- and nickel-plated Pt electrodes, activation energy was 6000-6700 cal/mole. This process was accompanied by concentration polarization. The metals were quantitatively deposited in the form of brilliant, fine-crystalline substances. The high value of B (12,000 - 13,000 cal/mole) during the electrolysis of Sn and Sb on an Al cathode is due to the destruction of the passivating film on the Al surface. The Sn and Sb deposits became loose as a result of the dissolution of Al. Nonetheless, they were quantitatively deposited. S. V. Gorbachev is mentioned. There are 4 figures, 2 tables, and 11 Soviet references.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet (Rostov-na-Donu State University)

SUBMITTED: April 1, 1959

Card 2/2

KOVALENKO, P.N.; BASHKOVA, L.F.

Polarographi; determination of zinc in granular slags, with its preliminary extraction by cementation with metallic magnesium. Zhur. prikl. khim. 33 no.11:2471-2475 N '60. (MIRA 14:4)

1. Rostovskiy-na-Donu Gosudarstvennyy universitet.  
(Zinc—Analysis)  
(Magnesium)

S/137/61/000/012/146/149

A006/A101

AUTHOR: Kovalenko, P. N.

TITLE: The use of a polarograph to study some factors affecting the rate of metal electrolysis

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 12, 1961, 12, abstract 12K65 (V sb. "Fiz. khim. metody analiza i kontrolya proiz-va", Rostov-na-Donu, Rostovsk. un-t, 1961, 3-21)

TEXT: The author studied the effect of the concentration of complex-forming Na citrate and tartrate components on the effective diffusion factor and the radius of solvated Cd and Pb ions. The rate of electrodeposition of the metal is determined by the rate of ion diffusion from the solution into the surface diffusional layer. Electrodeposition proceeds according to the law of single-molecular reactions. The author investigated the effect of citrate concentration on the rate of electrolytical Cu deposition. The effect of the composition of the medium on changes in the motion speed of ions is shown in the effective factor of their diffusion ( $D_e$ ). To measure  $D_e$  the polarographic method is employed. The radius and thickness of coatings of solvated Bi, Cu, Pd, Cd

Card 1/2

The use of a polarograph to study ...

S/137/61/000/012/146/149

/J06/A101

and Mn ions are calculated by the Smolukhovskiy-Einstein formula. In an HCl-medium Bi has the least effective radius, the thickness of the solvated coating is small, the Bi ion acquires a greater mobility and the electrodeposition rate is relatively high. The Pb-ion behavior is analogous. Cu forms complex salts with plain inorganic compounds. The effective radius of ions subjected to electro-reduction on the cathode, depends strongly on pH of the solution. The diffusion rate at higher pH decreases in all cases with the exception of Zn. The presence of gelatin reduces the diffusion rate of ions. There are 40 references.

V. Pedanova

[Abstracter's note: Complete translation]

Card 2/2

S/137/61/000/012/147/149  
A006/A101

AUTHORS: Lektorskaya, N. A., Kovalenko, P. N.

TITLE: Determining molybdenum by the polarographic method

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 12, 1961, 13, abstract  
12K69 (V sb. "Fiz.-khim. metody analiza i kontrolye proiz-va".  
Rostov-na-Donu, Rostovsk. un-t, 1961, 28-32)

TEXT: An investigation was made for the purpose of selecting more simple conditions for the polarographic determination of Mo. The measurements were made on a visual polarograph with a galvanometer. To prepare the Mo solution ammonium molybdate salt was employed. The concentration of the initial solution was  $1 \cdot 10^{-2}$  mol/l. Investigations were made on the reduction of Mo in acetic and boric acid solutions, a mixture of glycerin and  $H_2SO_4$  solution, K rhodanide and  $CH_3COOH$  solutions. It was established that molybdate ions were reduced on a drop Hg-cathode on a background of  $CH_3COOH$  at  $\sim 0.42$  v of the halfwave potential. The intensity of the diffusional current and the halfwave potentials are practically constant at 1.0 - 3.5 n.  $CH_3COOH$  concentration. The diffusional waves are well pronounced. The intensity of the diffusion current of Mo is a direct

Card 1/2

Determining molybdenum by the polarographic method

S/137/61/000/012/147/149  
A006/A101

function of its concentration. On the basis of data obtained, a method was developed to determine Mo in steel. The steel sample is dissolved in HCl in the presence of  $\text{HNO}_3$ . The hot solution is neutralized with a NaOH solution so that  $\text{Fe}(\text{OH})_3$  precipitates. The solution with the precipitate is brought to boiling, cooled and transferred into a measuring retort, filled up to the mark and filtered. A portion of the filtrate is placed into 2 measuring retorts. In one of the retorts a titrated solution of ammonium molybdate is added, then 3 - 4 drops of  $\text{CH}_3\text{COOH}$  are added into both retorts and the solution is filled up to the mark. Prior to polarography,  $\text{N}_2$  is blown through the solutions during 10 - 15 minutes. There are 12 references.

L. Vorob'yeva ✓

[Abstracter's note: Complete translation]

Card 2/2

S/137/62/000/002/143/144  
A052/A101

AUTHOR: Kovalenko, P. N.

TITLE: The polarographic determination of Pb and Bi in the presence of Fe

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 14, abstract 2K67  
(V sb. "Fiz.-khim. metody analiza i kontrolya proiz-va". Rostov-na-Donu, Rostovsk. un-t, 1961, 22-27)

TEXT: The conditions of the polarographic determination of Pb and Bi in the presence of Fe are worked out. To reduce  $Fe^{3+}$  to  $Fe^{2+}$  hydroxylamine is used. The polarography of Bi and Pb is performed on the nitrotartaric background at pH = 4.2 - 4.5 and the Na tartrate concentration of 0.1 - 0.5 mol/l. The value of diffusion current of Bi and Pb does not change with an increase of hydroxylamine concentration up to 2%. Small quantities of  $Fe^{2+}$  do not change the intensity of diffusion current of Bi and Pb;  $FeSO_4$  concentrations from 0.2 to 0.3 mol/l reduce diffusion current by 5 - 10.5% for Bi and up to 13% for Pb. For a complete reduction of  $Fe^{3+}$  to  $Fe^{2+}$  at its content of 0.2 - 0.3 mol/l, 2% hydroxylamine is sufficient. As a more effective variant of the polarographic analysis of Bi and Pb it is recommended to apply a preliminary cementation of ions of these metals.

Card 1/2

The polarographic determination ...

S/137/62/000/002/143/144  
A052/A101

with Zn, this cementation proceeds rather satisfactorily in 2-normal HCl solution with the addition of 3 g Zn.

L. Vorob'yeva

[Abstracter's note: Complete translation]

Card 2/2



S/081/61/000/022/016/076  
B102/B108

AUTHORS: Kovalenko, P. N., Bagdasarov, K. N., Byzova, R. P.  
TITLE: Electrolytic separation of bismuth from small quantities of lead and cobalt, cadmium and zinc, and the polarographic determination of microimpurities

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 22, 1961, 108-109, abstract 22D39 (Sb. "Fiz.-khim. metody analiza i kontrolya proiz-va", Rostov-na-Donu, Rostovsk. un-t, 1961, 33-41)

TEXT The conditions of electrodeposition of Bi from nitric-acid solutions containing glucose on a Cu-coated Pt cathode are investigated. The effects of acidity of the solution and of temperature on the rate of electrodeposition of Bi at constant cathode potential, and on the quality of the deposit are shown. A combined electrochemical method of determining microquantities of Pb and Co, Cd and Zn in electrolytic Bi solutions has been worked out. In electrolysis with nitric-acid solutions Bi is deposited quantitatively, the metal impurities are determined polarographically upon a background of 0.5M KSCN solution. [Abstracter's Card 1/2] ✓

Electrolytic separation of bismuth...

S/081/61/000/022/016/076  
B102/B108

note Complete translation.]

Card 2/2

2/137 61/000/012/145/149

ACC: 1.1

AUTHOR: Kovalenko, P. N.

TITLE: Electrolytic separation of lead from cadmium and polarographic determination of cadmium in a tartrate buffer solution

PERIODICAL: Referativnyi zhurnal, Metallurgiya, no. 12, 1961, 11, abstract 12K61 (V sb. "Fiz.-khim. metody analiza i kontrolya proiz-va" Rostov-na-Donu, Rostovsk. un-t, 1961, 42-50)

TEXT: An electrolytical method is suggested of separating and determining Pb and Cd at low Cd contents on an Al-cathode. The method is based on Pb electrolysis at pH 4 and optimum Na tartrate concentration of 0.4 mol/l, and on the further determining of Cd by the polarographic method on the background of an ammonia-tartrate buffer solution. The bias voltage of salt decomposition and the cathode potential under changed electrolytical conditions, were studied by the compensation method. The cathode potential was measured 2 minutes after the current supply to the circuit. The cathode was a spiral-shaped cylinder; the wire length was 97 cm, the diameter was 0.23 cm and the operational surface of the electrode 70 cm<sup>2</sup>. A Pt-Winkler electrode was employed as anode. The

Card 1/3

Electrolytic separation of lead from cadmium ...

S/137/61/000/012/145/149  
A006/A101

author studied the effect of temperature, pH of the electrolyte, and the concentration of Na tartrate on the salt decomposition voltage, the magnitude of the cathode potential and the quality of the Pb-deposit singled out. With higher pH of the solution increasing to 4, the salt decomposition voltage of Pb decreases and with a further increase of pH rises sharply, since the stability of the complex compound of the Pb tartrate ion increases. The salt decomposition voltage of Cd increases gradually if pH rises up to 4. At pH > 4 the salt decomposition voltage becomes higher than in Pb salt, the potential of Cd deposition is shifted in respect to Pb toward a more negative side since changes of the anodic process of Pb decomposition take place; the Pb is deposited on the anode in the form of  $PbO_2$ . At pH 4 the greatest difference is observed between the salt decomposition voltage of Cd and Pb and between the deposition potentials of these metals. Electrolysis is performed at 50°C, 1.85 v voltage, and 1.60 v at 75°C. The quality of the metal deposit is better at 75°C since it is deposited in the form of a dense layer. To accelerate Pb deposition its electrolysis is carried out in the presence of 0.5 - 1.0 g hydrazine chloride, at a difference of potentials as high as 1.2 v. Under these

Card 2/3

Electrolytic separation of lead from cadmium ...

S/137/61/000/012/145/149  
A006/A101

conditions Pb is fully deposited on the cathode within 70 - 90 minutes. After singling out Pb, Cd is polarographically determined from the same solution.

V. Fedanova

[Abstracter's note: Complete translation]



Card 1/3

S/137/61/000/011/119/123  
A060/A101

AUTHOR: Kovalenko, P.

TITLE: Electrolytic separation of bismuth from nickel and the polarographic determination of nickel

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 11, 1961, 11, abstract 11K69. (V sb. "Fiz.-khim. metody analiza i kontrolya proiz-va" Rostov-na-Donu, Rostovsk. un-t, 1961, 51 - 58)

TEXT: The method of electrolytic deposition is used for separating Bi from small quantities of Ni, making it possible to avoid the deposition of Ni. The electrolytic separation of Bi from small quantities of Ni in a nitric acid solution without cathode-potential control is carried out in 60 min at 60 - 70°C, voltage 2 volts and at an HNO<sub>3</sub> concentration of 0.14 - 0.18 N. A higher potential promotes the formation of a crude, nonuniform and loose deposit, capable of absorbing Ni ions. A lower potential leads to the formation of an amorphous loose deposit which is washed with considerable losses. The polarography of Ni is carried out using as background a 0.8 N solution of KSCN at pH 4 - 5 in the presence of commensurate quantities of Bi, Co and other

(card 1/2

Electrolytic separation.....

A/137/61/000/011/119/123  
A060/A101

cations. After separating the Bi, the solution is evaporated down to a small volume, transferred into a 50-ml flask, and a pH of about 4 - 5 is established. Then one adds the KCN solution and the polarography is carried out. The  $E_{1/2}$  of Ni on this background is  $\approx 0.69 - 0.71$  volts. The error of Ni determination is  $\pm 4\%$  (relative). There are 17 references.

V. Pedanova

[abstracter's note: Complete translation]

Card 2/2

S/137/61/000/012/048/149  
A006/A101

AUTHOR: Kovalenko, P. N.

TITLE: Decomposition voltage and deposition potential during nickel electrolysis from buffer solutions using platinum electrodes

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 12, 1961, 31, abstract 123217 (V sb. "Fiz.-khem. metody analiza i kontrolya proiz-va", Rostov-na-Donu, Rostovsk. un-t. 1961, 69 - 79)

TEXT: The author studied optimum conditions of Ni-deposition from an oxalate buffer solution in the form of a dense, lustrous, metallic deposit without impurities. The investigation was made with  $4.96 \cdot 10^{-2}$  n. Ni solution; pH of the solution varied from 2 to 10. The decomposition voltage and the Ni deposition potential increased continuously with higher pH, in particular, at 0.28 mole/l concentration of ammonium oxalate within 2 - 4 pH. At a rise of the solution temperature up to 60°C, the values of decomposition voltage and Ni deposition potential increase; at a rise up to 80 - 100°C, these values drop considerably due to reduced cathode polarization. Best conditions of electrolytical Ni deposition from an oxalate solution are: 0.21 M solution  $(\text{NH}_4)_2\text{C}_2\text{O}_4$ , pH 4, temperature 100°C.

Card 1/2



Decomposition voltage and deposition potential...

S/137/61/000/012/048/149  
A006/A101

voltage 1.6 - 1.8 v. During electrolysis of  $5 \cdot 10^{-2}$  n.  $\text{NiSO}_4$  solution (0.176 g per 120 ml) in the presence of 0.21 mole/l of ammonium oxalate, its basic amount (80%) is deposited within 40 minutes; during electrolysis of  $1 \cdot 10^{-2}$  and  $5 \cdot 10^{-3}$  n. solution, 50 - 40% are deposited. There are 26 references. ✓

G. Svodtseva

[Abstracter's note: Complete translation]

Card 2/2

S/137/61/000/011/109/123  
A060/A101

AUTHORS: Kovalenko, P. N., Rozin, G. N., Osipov, O. A., Yevstifeyev, M. M.,  
Kravtsov, Ye. Ye.

TITLE: Anodizing in the presence of chlorine ions and the quality control  
of the oxide film for the Д 16 Т (D16T) alloy

PERIODICAL: Referativnyi zhurnal. Metallurgiya, no. 11, 1961, 61, abstract  
11I406 (V sb.: "Fiz.-khim. metody analiza i kontrolya proiz-va".  
Rostov-na-Donu, Rostovsk. un-t, 1961, 97 - 102)

TEXT: The effect of the presence of  $Cl^-$  in the anodizing vat upon the po-  
tential, thickness of the oxide layer, and the duration of the drop test of the  
D16T alloy in the process of sulfuric acid anodic oxidizing was investigated.  
The presence of 0.5 g/liter  $Cl^-$  improves the poential of the alloy being anodized  
and leads to the production of thinner films, with practically no effect upon the  
thickness and formation rate of the oxide film being formed. The possibility is  
shown of sulfuric acid anodizing of clad sheet D16T duralumin in the presence of  
 $Cl^-$  to the quantity  $\leq 0.5$  g/liter. The optimum conditions of anodizing, both in

Card 1/2

Anodizing in the presence of...

S/137/61/000/011/109/123  
A060/A101

✓

the presence and the absence of chlorides, are  $D_a$  2 amps/dm<sup>2</sup> and the anodizing time is 30 min. There are 8 references.

Ye. Layner

[abstracter's note: Complete translation]

Card 2/2

S/137/61/000/011/110/123  
A060/A101

AUTHORS: Kovalenko, P. N., Mosin, G. N., Csipov, O. A., Yevstifeyev, M. M.,  
Kravtsov, Ye. Ye.

TITLE: Filling and control of anodized alloy D 16 T (D16T) in the presence  
of chlorine and sulfate ions

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 11, 1961, 61, abstract  
111407 (V sb.: "Fiz.-khim. metody analiza i kontrolya proiz-va",  
Rostov-na-Donu, Rostovsk. un-t, 1961, 103 - 114)

TEXT: The authors studied the effect of the presence of chlorine and sul-  
fate ions upon the process of chromate filling of the oxide film on the D16T  
alloy. The dependence of the film quality (drop test and thickness of the film)  
upon the concentration of impurity ions is established. Sulfate ions suppress  
the chromate ion adsorption, as result of which the films have a lighter tint.  
It is recommended that films formed at high D be subjected to a longer filling.  
It is entirely possible to raise the admissible limit of admixtures in the fil-  
ling vat from 1.5 to 3, and from 3 to 6 grams per liter for chlorine and sulfate  
ions respectively. There are 8 references.

[Abstracter's note: Complete translation]  
Card 1/1

Ye. Layner